

REMARKS

Claims 1, 11, 18, and 21 have been amended. Support for the amendments to claims 1, 11, and 18 may be found in at least paragraphs 45 and 48 of the Specification. Support for the amendments to claim 21 may be found in at least paragraph 63 of the Specification. Claims 24 and 25 have been cancelled. Therefore, claims 1-23 remain pending in the application.

35 U.S.C. § 112 Rejection:

The Office Action rejected claims 21-23 under 35 U.S.C. § 112, second paragraph as being indefinite. Applicant submits that the amendment to claim 21 overcomes these rejections.

35 U.S.C. § 103(a) Rejections:

Claims 1, 7, 8, 9, 11, 14, 15 and 18 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Graves, et al. (U.S. Publication 2002/0196506) (hereinafter "Graves") in view of Islam (U.S. Patent 6,356,384). Applicant respectfully traverses these rejections and requests reconsideration in view of the following discussion.

In paragraph 4 of the present Office Action regarding claim 1, the Examiner admits that Graves does not disclose a combination amplifier (w.r.t. claim 8, including a Raman amplifier) used to amplify an optical signal, but that Islam disclosed a combination amplifier using Erbium and Raman (Figure 1A) in a fiber optic system. However, Applicant has amended claim 1, which now recites in relevant part:

“...a combination optical amplifier coupled to said fiber optic cable and configured to amplify said optical signal;
wherein said combination optical amplifier comprises at least:
a first optical amplifier having a maximum gain at a first wavelength; and
a second optical amplifier having a maximum gain at a second wavelength different from the first wavelength; and

wherein the first optical amplifier and the second optical amplifier each amplify said optical signal ...” (emphasis added).

Applicant submits that amended claim 1 recites limitations not taught or suggested by the cited art. Islam discloses a broadband optical amplifier that uses parallel amplification by a combination of optical amplifiers. More specifically, Islam discloses

“... Amplifier 10 (FIG. 1(a)) and amplifier 11 (FIG. 1(b)) each include at least one input fiber 12 coupled to a splitter 14. Examples of splitters include WDM couplers, fused tapered couplers, Mach-Zehnder interferometers, gratings and circulators, and the like. Splitter 14 divides an optical signal having a wavelength between 1430 nm and 1620 nm at a predetermined wavelength, preferably at 1525 nm, into at least a first wavelength and a second wavelength. A Raman amplifier 16 and a rare-earth doped optical amplifier 18 are coupled to splitter 14 and arranged in a parallel manner. Raman amplifier 16 receives the first band and produces an amplified broadband first band. Rare-earth doped optical amplifier 18 receives the second band and produces an amplified broadband second band.

A combiner 20 is coupled to Raman amplifier 16 and rare-earth doped optical amplifier 18. Combiner 20 combines the amplified and spectrally broadened first and second bands to produce an amplified broadband optical signal.” (Islam, col. 3, line 58 – col. 4, line 9).

It is noted that the disclosed splitter 14 divides the optical signal into at least a first and a second band, and that one amplifier amplifies the first, but not the second band and another amplifier amplifies the second, but not the first band. The resulting amplified bands are combined by combiner 20. In other words, the individual amplifying elements are arranged in parallel paths. Islam further discloses a reason for this arrangement in the Background:

“For wavelengths shorter than about 1525 nm, erbium-atoms in typical glasses will absorb more than amplify.” (Islam, col. 1, lines 46-48).

Consequently, Islam splits wavelengths shorter than about 1525 nm from wavelengths longer than 1525 nm, amplifying the shorter wavelengths with a Raman amplifier so that they are not reduced in amplitude by the absorption of the erbium-atoms. Once the two

sets of wavelengths have been separately amplified, they are re-combined to form the amplified optical signal.

In contrast, claim 1 recites, "the first optical amplifier and the second optical amplifier each amplify said optical signal". This differs from Islam, in which an optical signal is split into at least two bands, with individual amplifiers amplifying only a portion of the original optical signal. Applicant finds no teaching or suggestion in Islam, either alone or in combination with Graves, of a first optical amplifier having a maximum gain at a first wavelength; and a second optical amplifier having a maximum gain at a second wavelength different from the first wavelength; and wherein the first optical amplifier and the second optical amplifier each amplify said optical signal. Accordingly, Applicant submits that that claim 1 is patentably distinguishable over the cited art for at least the above reasons. Further, because independent claims 11, 18, and 21, as amended, include similar features to those of amended claim 1, claims 11, 18, and 21 are patentable over the cited art for similar reasons. As each of dependent claims 2-10, 12-17, 19, 20, 22, and 23 includes at least the features of the independent claims upon which they depend, each of the dependent claims is believed patentable as well.


In addition, in the present Office Action, claims 2-6, 19, and 20 were rejected as being unpatentable over Graves in view of Islam as applied to claims 1, 8, 11, and 18 above, and further in view of Akkapeddi (U.S. Patent 4,949,056), claim 10 was rejected as being unpatentable over Graves and Islam as applied to claim 9 above, and in further view of Fukuchi (U.S. Publication 2002/0064340), claims 12 and 13 were rejected as being unpatentable over Graves and Islam as applied to claim 11 above, and in further view of Day (U.S. Patent 6,266,464), claims 21, 24, and 25 were rejected as being unpatentable over Graves in view of Islam and Myrick, et al. (U.S. Patent 6,198,531), and claims 22 and 23 were rejected as being unpatentable over Graves in view of Islam and Myrick as applied to claim 21 above, and in further view of Akkapeddi. In view of the above remarks, further traversal of these rejections is believed unnecessary at this time.

CONCLUSION

Applicant submits the application is in condition for allowance, and notice to that effect is respectfully requested.

If any extension of time (under 37 C.F.R. § 1.136) is necessary to prevent the above-referenced application from becoming abandoned, Applicant(s) hereby petition for such an extension. If any fees are due, the Commissioner is authorized to charge said fees to Meyertons, Hood, Kivlin, Kowert, & Goetzel, P.C. Deposit Account No. 501505/5957-16300/ RDR.

Respectfully submitted,



Rory D. Rankin
Reg. No. 47,884
ATTORNEY FOR APPLICANT(S)

Meyertons, Hood, Kivlin,
Kowert, & Goetzel, P.C.
P.O. Box 398
Austin, TX 78767-0398
Phone: (512) 853-8800

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